CHEMISTRY

Experiments With Kitchen Chemicals

These Would Provide Fun for Your Friends

SCIENCE
Serving Science Clubs of Ameri

By JOSEPH H. KRAUS
Science Clubs of America Editor

EVERY KITCHEN has a plentiful supply of chemicals. Salt is sodium chloride; baking soda is sodium bicarbonate; borax is sodium tetraborate; cane sugar is sucrose; washing soda is sodium carbonate. Then, too, we will find many other chemicals in the home medicine cabinet or among the washing preparations such as ammonia, bleaching powders, cleaning fluids and iodine, alcohol, etc. With these many interesting experiments may be developed.

Steel wool is used in the average home for scouring pots and pans. Steel wool in the presence of water oxidizes rapidly, that is, it rusts. This rusting is the result of oxidation. We can prove this easily. A small bundle of steel wool is soaked in ordinary household vinegar. The vinegar is then shaken out of the steel wool and the steel bundle is pushed into the bottom of a milk bottle. This prepared bottle is inverted in a bowl of water on two match sticks as shown at 1. To accentuate the dramatic effect the water may be colored with a couple of drops of ink. Air contains approximately 80 per cent. nitrogen and 20 per cent. oxygen. After a day or so, most of the oxygen in the bottle will be consumed and the water will rise to take its place. Meanwhile, the steel wool rusts. This rusting stops when four-fifths of the original air remains; namely, the four-fifths of the atmosphere which contains the inert nitrogen.

The next time you have occasion to cut the rind from an orange or lemon, bend it with the skin side out, and press between the fingers, directing the action toward a candle or other flame. Brilliant sparks of light will be produced. These result from the burning of the oils projected toward the flame with considerable force when pressure within the tiny cells of which the skin is formed increases and the cell walls burst suddenly. Direct the action toward your face or tongue and you will be able to feel or taste the minute droplets.

Osmosis is the name by which is known the phenomenon of passage of fluids of different densities through a membrane. An ideal membrane for this purpose is the one contained in an ordinary egg. With a needle drill a hole through the top of the smaller end of an egg. Suck out the contents (they won't harm you if the egg is fresh); but if you do not like raw eggs you can shake the contents into a cup. Tap the round end of an egg gently, cracking the shell. Then, with a pair of tweezers, break off pieces of shell but leave the membrane intact. Attach a glass straw to the top of the egg using sealing wax or paraffin for this purpose. With a medicine dropper fill the egg with a strong solution of sugar dissolved in water. Then, support the egg in a dish of plain water. Soon you will notice that the contents of the egg increases. The sugar solution will pass through the membrane into the surrounding water. But a greater quantity of water will pass into the egg. This is osmosis. Try the same experiment with prunes. Drop a dried prune into a glass of plain water; place another in a glass of strong sugar and water. You will observe that in plain water the prune swells while the one in sugar water remains wrinkled. Can you tell why?

Place a teaspoonful of rubbing alcohol (pure alcohol is best) in the bottom of a saucer. In this dissolve a pinch or two of table salt. Add a small tuft of cotton about the size of a walnut. Light with a match. You will observe the bright yellow flame of sodium. Repeat this experiment in a dark room and look at the face and color of clothes worn by your companions. Also, examine a colored magazine cover under the sodium light. For other colors of flame, purchase a small quantity of barium sulphate, strontium nitrate and copper sulphate, from your corner druggist and repeat the experiment with each of these salts. Instead of a yellow flame you will get green, red and blue colors.

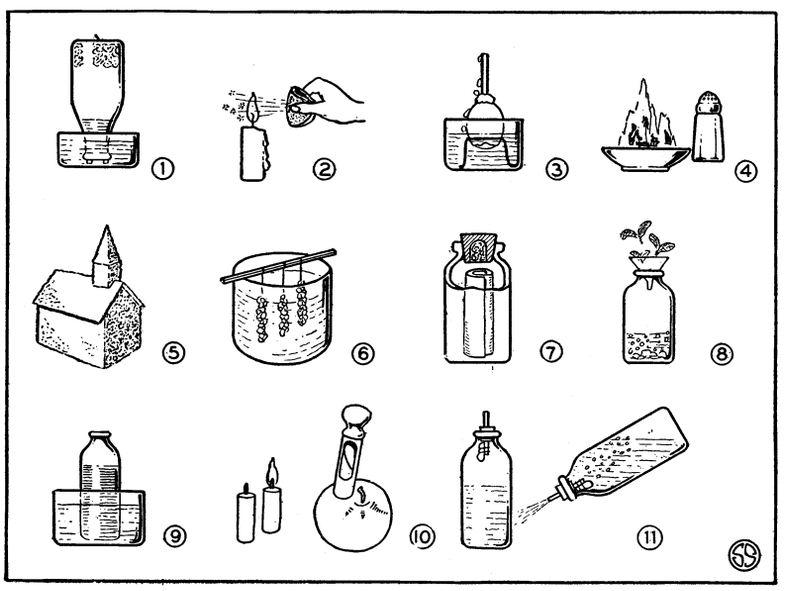
Make a small house, castle or church from cardboard and cement the pieces together with airplane cement. Unless you use a waterproof glue, the structure will come apart. Weight this model with a small stone and immerse it in a solution of sugar and water. Dissolve as much sugar as the water will hold. Within 24 hours you can remove a beautiful crystalized building covered with brilliant, large crystals of sugar. (See 5.)

Repeat the experiment except that you suspend white twine in the sugar solution. In this manner you will produce rock candy. You can color the rock candy by using any certified coloring solution. (These are usually found in the home and are employed in the making of cakes and cookies.)

Write a number of messages on as many separate sheets of paper. The ink you use for these messages should be a very weak solution of copper sulphate (obtained from your druggist) dissolved in water. The pen you use preferably should be a pointed piece of wood. This writing, when dry, should be absolutely invisible. Ask a friend to sign one of the blank sheets and insert it into a bottle. Stopper the bottle with the especially prepared cork. This is an ordinary cork hollowed out to receive a tuft of cotton which has been saturated with ordinary strong ammonia. The ammonia fumes inside the bottle will develop the writing and your friend will be mystified by his "fortune" which appears above his signature. (See 7.)

Pour some vinegar into the bottom of a bottle. Insert a funnel into a hole in a cork which fits this bottle. Make up a few butterflies either by cutting them out of thin tissue or by tying small feathers together as shown at 8. When ready for the experiment, dump a teaspoonful of bicarbonate of soda into the funnel. Carbon dioxide gas will be produced rapidly and as this escapes through the funnel, the butterflies will flutter up and down.

Dissolve a teaspoonful of cornstarch in a pint of water and to this add a drop or two of iodine. You will find that



OBSERVER

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the solution turns blue. (This blue color produced when iodine is added to starch is a test for starch.) Place a pot of water on the stove and put in it the bottle with its contents, as shown at 9. Allow the water to come to a boil and heat the contents of the bottle in this fashion until the blue color disappears. Set this bottle on the table in the presence of your spectators. As the contents cool the blue color returns.

You can add a little humor to your presentation by cutting cylinders from an apple. For this purpose an apple corer may be used; even better is an ordinary metal tube. With a sharp knife cut off the top and bottom of each section squarely. In the top of each apple cylinder insert a small piece of any kind of nutmeat. When ready for the demonstration light the nut. It will burn for some time and from a short distance the arrangement will look like a genuine candle. Pop the candles into your mouth one at a time and devour them, flame and all. You will not be burned if you exhale through your mouth while inserting the apple into your mouth. Close mouth promptly. This is bound to get a laugh.

The construction of a fire extinguisher is shown at 11. This consists of a one-hole stopper, preferably containing a glass tube. To this tube is attached, with a rubber band, a package made from ordinary tissue paper containing bicarbonate of soda. In the bottom of the fire extinguisher is ordinary vinegar and water, half and half. When the fire extinguisher is inverted the vinegar rapidly penetrates the tissue paper and acts upon the bicarbonate. Gas is produced which fills the inside of the bottle and ejects the contents of the bottle forcibly.

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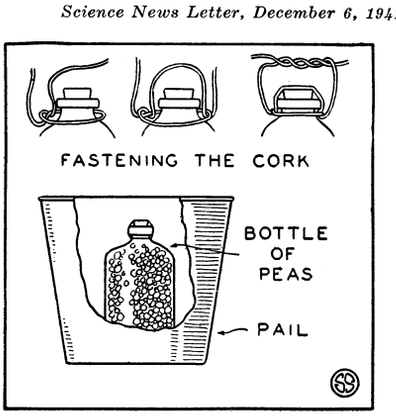

PHYSICS

The Strength of Peas

FILL A SMALL BOTTLE with ordinary dry peas or beans. Then add water so there is no air space left in the bottle and cork the bottle tightly. If the bottle is provided with a screw cap, you will have little difficulty in making a perfect seal. If an ordinary cork is used, however, this cork should be tied in place. The illustration above shows a simple method of fastening a cork in a bottle. Ordinary twine is used for this purpose. By pulling down on the ends of the cord, the twist, which substitutes for the knot, will be imbedded in the top of the cork and the string will not slip.

Set this arrangement in a pail. Overnight the swelling peas will exert so much pressure on the inside of the bottle that they will burst the glass.

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NEWS OF CLUBS

WASHINGTON—The dedication of the new Science Service building with Vice-President Wallace speaking is an important occasion for Science Clubs of America. It is suggested that clubs arrange to meet at that time (Saturday, Dec. 13, 1:30 p. m. EST) around a radio tuned to a nearby CBS station. See page 354.

STAUNTON, Va.—Amazing as it may sound the Science Club of the Virgina School for the Blind is studying photography this year. The group has been interested in science for some time; in fact, in addition to its affiliation with Science Clubs of America, the group is a charter member of the Virginia Junior Academy of Science. The sponsor of the club is Robert E. Bruce, Teacher of Science and Mathematics.

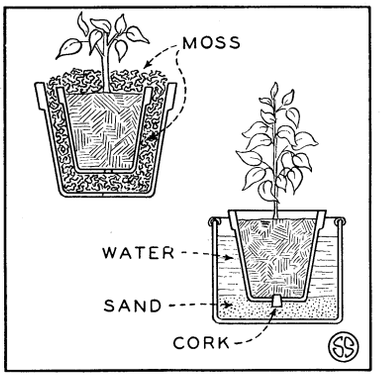
WILMINGTON, Del.—The Science Club of Henry C. Conrad High School has an enrollment of 86 members. The club is divided into two sections; one devoted to physics and chemistry and the other to biology. Each of these sections meets separately for projects and general meetings. However, special events are arranged to enable the entire membership to get together. Each group works upon projects and demonstrations which are presented to elementary school science classes. These aid local teachers in giving demonstrations of simple principles of physics, chemistry and biology. "This club will cooperate and do everything in its power to aid in the development of a Science Center in the state of Delaware," reports G. Emmett C. Kauffman, Instructor in Chemistry and Physics and sponsor of the club.

ST. LOUIS, Mo.—Among the general science activities conducted by members of the Bayless Science Club, Bayless High School, are listed such interests as taxidermy, radio, photography, aviation and projects in biological and physical sciences. This group is sponsored by Marcus Mitchell, Science Teacher, who previously sponsored the Rich Hill, Mo., High School Science Club.

SOUTH BEND, Ind.—Tentative plans for a Science Fair have been formulated by the Riley Senior Science Club of the Riley Junior-Senior High School. Meeting once a week, the club alternately devotes one week to laboratory experiments and demonstrations and the next week to reports on recent scientific advances. This plan has been very successful, according to the report from C. C. Schubert, Head of the Science Department and sponsor of the club.

SAULT STE. MARIE, Mich.—A science club has been in existence for the past fifteen years at Central High School. Activities of the Atom Crackers, as this group is known, are greater this year than ever. Present interests are the soilless growth of plants, ultra-violet light experiments, photography, chemical stunts and serious chemical projects. This group is sponsored by Aurid Dean, Head of the Science Department.

Clubs are invited to become affiliated with SCA for a nominal $2 for 20 members or less. You can become an associate of SCA for 25 cents, which includes a copy of the 128-page Science Handbook for 1942. Address: Science Clubs of America, 1719 N St., N.W., Washington, D. C.



HORTICULTURE

How To Keep Indoor Plants Watered in Your Absence

THE CHRISTMAS and Easter holidays will find many of us away. At this time the question always arises: "How are we going to care for the growing plants on the window sills or in a small greenhouse while we are away?"

A most satisfactory method is illustrated in the accompanying diagram. The growing plant is put into a larger pot. The area between is filled with moss and a layer of moss about one inch deep also covers the soil. This moss is well wetted down just before we leave for our vacations. When we return we will find that our plants have been kept in good condition.

Plants which require a greater quantity of moisture may be treated as in the second illustration. Here we can use gallon jugs with the tops cut off. The hole in the bottom of the flower pot is plugged with a cork and the potted plant is then rested on a layer of sand. The surrounding water will seep through the pores of unglazed and unpainted clay pots. This method is not successful with plants growing in glass or non-porous pottery.

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SCIENCE CLUBS OF AMERICA

SCA, under Science Service sponsorship, continues the pioneering activities of the American Institute of City of New York over the past 15 years and the Student Science Clubs of America which was merged with that movement. The American Institute continues to foster the regional activities of the junior clubs of the New York City area as a science center.

To effect close cooperation between the American Institute and Science Service, an advisory committee on SCA is being formed.

The principal SCA staff consists of Joseph H. Kraus, SCA editor, and Margaret E. Patteron, SCA membership secretary, based at New York in offices at 310 Fifth Avenue, also occupied by the American Institute, H. D. Lufkin in charge, and its Science Laboratory, Henry Platt directing.